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REGULATORY GUIDE

Transportation Security Plans for Category I, II or III Nuclear Material

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REGULATORY DOCUMENTS

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Canadian Nuclear Safety Commission
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Communications and Information Management Directorate
Canadian Nuclear Safety Commission
280 Slater Street
P. O. Box 1046, Station B
Ottawa, Ontario K1P 5S9
CANADA

Telephone: (613) 995-5894 or 1-800-668-5284 (Canada only)
Facsimile: (613) 992-2915
E-mail: publications@cnsccsn.gc.ca

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TRANSPORTATION SECURITY PLANS FOR CATEGORY I, II OR III NUCLEAR MATERIAL

1.0 PURPOSE

The purpose of this regulatory guide is to help applicants for a Canadian Nuclear Safety Commission (CNSC) licence to transport Category I, II or III nuclear material prepare and submit a “written transportation security plan” that meets the requirements of section 5 of the *Nuclear Security Regulations*.

Category I, II and III nuclear material are defined in Appendix B to this guide.

2.0 SCOPE

This guide describes:

- the information that should typically be included in the transportation security plan referred to above;
- the transport security measures that should be taken into account when developing the transportation security plan; and
- how the transportation security plan should be handled in order to meet requirements related to confidentiality and national security.

Other federal requirements related to the transport of Category I, II or III nuclear material, such as those pertaining to packaging, documentation and safety markings, can be found in the CNSC *Packaging and Transport of Nuclear Substances Regulations* and the Transport Canada *Transportation of Dangerous Goods Regulations*.

3.0 BACKGROUND

3.1 Regulatory framework

The CNSC is the federal agency that regulates the use of nuclear energy and material to protect health, safety, security and the environment, and to respect Canada’s international commitments on the peaceful use of nuclear energy.

The *Nuclear Safety and Control Act (NSCA)* requires persons or organizations to be licensed by the CNSC for carrying out the activities referred to in section 26 of the *NSCA*, unless otherwise exempted. The associated regulations stipulate prerequisites for CNSC licensing, and the obligations of licensees and workers.

3.2 CNSC licensing process

The CNSC typically applies a phased process to its licensing of nuclear facilities and activities. For major facilities, this process begins with a consideration of the environmental impacts of the proposed project, and proceeds progressively through site preparation, construction, operation, decommissioning and abandonment phases.

The NSCA and its regulations require applicants to provide certain information at each licensing stage. The type and level of detail of this information will vary to accommodate the licensing stage and specific circumstances.

At all licensing stages, applications may incorporate (directly or by reference) new or previously submitted information, in accordance with legislated requirements and the best judgement of the applicant. An application that is submitted at one licensing stage can become a building block for the next stage.

Upon receipt of an application that is complete, the CNSC reviews it to determine whether the applicant is qualified to carry on the proposed activity, and has made adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed. If satisfied, the CNSC may issue, renew, amend or replace a licence that contains relevant conditions. Typically, this licence will incorporate the applicant's undertakings and will contain other conditions that the CNSC considers necessary, including those that reference or incorporate a "written transportation security plan".

3.3 Legislative basis

The *Nuclear Security Regulations* and the *General Nuclear Safety and Control Regulations* contain the following provisions that are particularly relevant to the purpose and scope of this guide.

- Section 5 of the *Nuclear Security Regulations* requires that the application for a licence to transport Category I, II and III nuclear material contain a "written transportation security plan that includes
 - (a) the name, quantity, radiation level in Gy/h, chemical and physical characteristics and isotopic composition of the nuclear material;
 - (b) a threat assessment consisting of an evaluation of the nature, likelihood and consequences of acts or events that may place prescribed information or nuclear material at risk;
 - (c) a description of the conveyance;
 - (d) the proposed security measures;

- (e) the communication arrangements made among the licensee, the operator of the vehicle transporting the nuclear material, the recipient of the material, and any response force along the route;
- (f) the arrangements made between the licensee and any response force along the route;
- (g) the planned route; and
- (h) the alternate route to be used in case of an emergency.”
- Paragraphs 21(1)(c) and (d) of the *General Nuclear Safety and Control Regulations* stipulate that information concerning “the security arrangements, security equipment, security systems and security procedures established by a licensee in accordance with the Act [NSCA], the regulations made under the Act or the licence, and any incident relating to security” and “the route or schedule for the transport of Category I, II or III nuclear material” is “prescribed information” for the purposes of the NSCA.
- Section 23 of the *General Nuclear Safety and Control Regulations* sets out requirements that restrict or prohibit the transfer or disclosure of prescribed information.

4.0 TRANSPORTATION SECURITY PLAN

4.1 Content

To comply with section 5 of the *Nuclear Security Regulations*, an application for a licence to transport Category I, II or III nuclear material shall include a written transportation security plan that contains the information required by paragraphs 5(a) to (h) of the same regulations. Guidance on the information that is to be included in the plan to meet these requirements is provided below. In addition, part 5.0 of this regulatory guide recommends measures on protecting nuclear material during transport that the applicant may find useful when developing a transportation security plan.

The primary purpose of a transportation security plan is to assure that the nuclear material to be transported will receive adequate physical protection against any threats that may arise during its transport. Accordingly, the security measures provided for in the proposed plan should be commensurate with the category of the nuclear material that is to be transported, and the associated threats. That is, security measures for the transport of Category I nuclear material should typically be more stringent than for the transport of Category II nuclear material, and those for the transport of Category II nuclear material more stringent than for Category III nuclear material.

When applying for a licence to transport Category I, II or III nuclear material, the applicant can expedite CNSC review and processing of the application by submitting a

security transportation plan that follows Appendix A to this guide and that adopts the subject headings of the following sections.

Throughout the plan, applicants should, whenever possible, name the key persons involved, provide their position titles, and describe their associated roles, responsibilities, authorities and accountabilities.

4.1.1 Administrative information

The administrative information should include:

- the complete legal name and business address of the applicant who is submitting the plan in support of a licence application pursuant to section 5 of the *Nuclear Security Regulations*;
- the complete legal name and business address of any individual who is authorized to serve as the applicant's representative in discussions with the CNSC concerning matters pertaining to the plan;
- the telephone and fax numbers, or e-mail addresses, where the applicant, or any representative of the applicant in matters pertaining to the plan, may be contacted during normal business hours; and
- a description of the licence application to which the plan pertains.

4.1.2 Description of the nuclear material

Pursuant to paragraph 5(a) of the *Nuclear Security Regulations*, the description of the nuclear material to be transported should include:

- the name of the nuclear material;
- the category and quantity of the nuclear material (gross mass, net mass and mass of nuclear material);
- the chemical and physical characteristics of the nuclear material;
- the isotopic composition of the nuclear material;
- the degree of enrichment or dilution of uranium 235, uranium 233 or plutonium; and
- the radiation level, in Gy/h, of the overall shipment as well as that of its discrete parts.

4.1.3 Threat assessment

Pursuant to paragraph 5(b) of the *Nuclear Security Regulations*, a transportation security plan shall include "a threat assessment consisting of an evaluation of the nature, likelihood and consequences of acts or events that may place prescribed information or nuclear material at risk".

All credible threats to the security of the shipment should be identified. Threat assessments for Category I and II shipments should be considerably more thorough than those for Category III shipments.

The CNSC expects that applicants, when evaluating threats to a proposed transport of Category I, II or III nuclear material, will communicate with their appropriate law enforcement agencies to determine whether these agencies consider the threats to be high, medium or low, and will factor the response received into the overall assessment.

The CNSC receives, from the responsible federal security agencies, assessments that identify known criminal, extremist or terrorist threats that involve the movement of nuclear material. Thus, the applicant, when preparing the application for a licence to transport Category I, II or III nuclear material, should contact the CNSC to determine whether it is aware of any special information that should be taken into account in the applicant's threat assessment.

4.1.4 Description of the conveyance

Paragraph 5(c) of the *Nuclear Security Regulations* requires that the transportation security plan provide "a description of the conveyance" for the proposed transport. This description should cover the act of conveyance from the time the shipment leaves its originating location until it reaches its planned destination. It should describe how the nuclear material will be contained or secured for transport, including the type, design, size and weight of any container to be used and any provision for securing the container to the transport vehicle.

If the proposed conveyance involves more than one mode of transport and multiple transfers of the nuclear material — for example, by road to a rail terminal, followed by rail-transport for a further stage of the journey, and finally by road to the planned destination site —, the details of the conveyance should be provided for each segment of the journey. These details should include the date, time and location of the planned transfers and the names of the persons to be responsible for ensuring the success of the transfers, and for verifying the integrity of the associated shipments.

Where interim storage of the nuclear material may be required during conveyance, the proposed security measures for the conveyance should provide for safe interim storage of the materials, as discussed in section 4.1.5.

The transportation security plan should also describe the proposed measures to assure that the vehicles to be used for transporting the nuclear material will be adequately maintained.

4.1.5 Proposed security measures

As required by paragraph 5(d) of the *Nuclear Security Regulations*, a description of the proposed security measures must be included in the transportation security plan.

To provide adequate protection during a conveyance, the proposed security measures should be commensurate with the specific circumstances. These measures should take into account the category of nuclear material to be transported, the size and type of the shipment, the distance and type of terrain to be covered, the mode of transport, the results of the threat assessment, and public concerns. Accordingly, the proposed security measures should typically describe:

- whether the shipment of Category I, II or III nuclear material is to be sealed or unsealed;
- whether armed or unarmed guards, escort personnel or escort vehicles are to be utilized;
- the number of any armed or unarmed guards, escort personnel or escort vehicles to be utilized;
- any provisions for the support of response forces along the transport route;
- any procedures for contacting, during the act of conveyance, the response force from any involved jurisdiction or agency;
- provisions for rigorous security searches of the proposed conveyance vehicles prior to shipment of nuclear material, for the purpose of detecting any sabotage attempt or other threat;
- contingency arrangements to address such events as a mechanical breakdown of a transport or escort vehicle, or a failure of the shipment to arrive at its destination at the expected time;
- the procedures to be followed during any scheduled stop, or unscheduled delay, during transport; and
- the measures to be in place at Canadian ports, air cargo terminals, or other locations where the nuclear material is to be stored and secured during transport.

The level of security for nuclear materials during interim storage while in transport, including during each overnight stop, should typically be comparable to that provided for the same category of nuclear material during its storage at a

licensed nuclear facility. These security arrangements should take into account the location of the proposed interim storage and the nuclear material's potential appeal to thieves or terrorists.

When proposing to transport nuclear materials on journeys that could take more than one day, the applicant should include provision for overnight stays at a prearranged location where the transport vehicle carrying the nuclear material can be immobilized and kept in a physically secure and appropriately monitored area. The provisions for preventing theft of the nuclear materials should include securing the materials to the vehicle.

In addition to dealing with scheduled stops at prearranged locations, the transportation security plan should describe the security measures to be taken in the event of unexpected delays caused by natural or other hazards.

The applicant should attempt to anticipate and address, at an early stage, any special public concerns, regarding the proposed transport, that could lead to negative media coverage, and to protests or demonstrations. Accordingly, the applicant should provide for effective contacts with local and provincial response forces, in order to gain early notice of any road closures or detours implemented to deal with such incidents.

4.1.6 Communication arrangements

Paragraph 5(e) of the *Nuclear Security Regulations* requires that the communication arrangements that will be in place throughout the transport of the nuclear material be part of the transportation security plan. These may include communication arrangements with:

- the licensee;
- the operator of the vehicle transporting the nuclear material;
- the recipient of the material;
- any response force along the transport route; and
- any transport security control centre that is to be established for the operation.

If the licence applicant proposes to use cellular phones for communications during the transport of Category II or III nuclear material, the proposal should provide for limited use of such phones and encryption of messages where possible. It is important that all those involved in the transport and security of nuclear material are aware that unencrypted communications by cellular phone are not secure. Accordingly, the use of cellular phones to send unencrypted

messages regarding the transport of Category I nuclear material is not recommended. For such situations, radio systems that utilize encryption features provide a more secure means of communication.

Whether a radio or a cellular phone is to be used, it is important to assure that communications coverage is adequate along the entire route. In remote regions, there may be gaps in cellular or radio coverage. Where it may not be possible to avoid such “blackout” areas along the transport route, other communications arrangements should be proposed. Consideration should be given to adopting new communication technologies as they are proven reliable.

For each primary communication method proposed, the transportation security plan should include appropriate emergency backup provisions. For example, where the use of cellular phones is proposed, the applicant should provide for the supply of more than one phone and supplementary power sources for the phones.

Applicants who plan to make regular shipments of nuclear material may wish to propose the establishment of a transport security control centre. Typically, such a centre would be operated during the shipment of nuclear material. Where the applicant proposes to establish a transport security control centre, the proposal should include provision for the training of the persons who will staff the centre. These staff should be trained in the techniques to be used to monitor the proposed shipments of nuclear materials, and in the proposed communications arrangements among the parties listed above.

The transportation security plan should also indicate the action to be taken if communications contact with a vehicle carrying nuclear material is lost. For such situations, applicants may wish to consider the use of electronic and satellite tracking devices, such as transponders that can be concealed on a vehicle or in the shipment. Such devices could be used to track the vehicle carrying nuclear material, and could be particularly useful in situations where communications are interrupted.

The proposed communications arrangements with response forces along the transport route should include notifying the relevant response force of any scheduled or unscheduled overnight stops, including the exact location of the overnight stops.

4.1.7 Arrangements with response forces

To meet paragraph 5(f) of the *Nuclear Security Regulations*, the transportation security plan must include the arrangements to be made between the licensee and any response force along the transport route.

The applicant's proposed arrangements should include provisions for establishing effective communications with any response force along the transport route, in accordance with section 4.1.6 above. The provisions should include notifying the response force from any involved jurisdiction or agency of the shipment, in advance of the actual transport.

As part of the applicant's proposed arrangements, a response force, such as a local law enforcement agency or a private security firm, may provide an armed escort for a shipment of nuclear material. Where the arrangements involve more than one law enforcement agency, the plan should describe the cooperative arrangements for transferring responsibility from one response force to another. For example, a transport route that crosses the border between Québec and an adjoining province would pass through the jurisdiction of the Sûreté du Québec, as well as the jurisdiction of the Ontario Provincial Police or the Royal Canadian Mounted Police, and, where these respective forces serve as escorts, would require corresponding transfers of responsibility. Accordingly, all changes in the proposed communications methods or protocols for the planned transfers of responsibility along a transport route — such as changes in radio frequencies or radio or cellular encryption methods — should be clearly described in the plan.

4.1.8 Planned and alternate routes

Under paragraphs 5(g) and (h) of the *Nuclear Security Regulations*, the transportation security plan shall include descriptions of “the planned route” and “the alternate route to be used in the event of an emergency”.

When selecting the planned or alternate routes for the transport of nuclear material, the applicant should take into account applicable regulations and ordinances regarding transport routes for hazardous materials, and choose routes that bypass urban areas wherever practical. However, if the proposed route is to pass through an urban area, the applicant should describe the precise route to be taken through the area, and how the shipment is to be scheduled to avoid times of peak traffic.

When proposing an alternate route, the applicant should take into consideration the feasibility and logistics of switching from one route to another during the

transport of nuclear materials. For example, to facilitate potential switches from a planned route to an alternate route, and vice versa, the applicant should ensure that adequate transportation connections exist between the proposed routes, and should provide accurate descriptions of the proposed routes for transferring between the planned and alternate routes.

When choosing routes for the transport of nuclear material, the applicant should take into account any obvious hazards, such as rockslides, floods or forest fires, that could adversely affect the transport at certain times.

4.2 Confidentiality

Since a transportation security plan for a licence to transport Category I, II or III nuclear material contains “prescribed information” for the purposes of the *NSCA*, it must be handled in such a way as to protect such information in accordance with the applicable provisions of the *General Nuclear Safety and Control Regulations*.

Licence applicants and licensees must take all necessary precautions to prevent unauthorized access to any prescribed information contained in a transportation security plan. Accordingly, the CNSC recommends that they follow Appendix A when preparing, submitting or revising a transportation security plan.

4.3 Regulatory review and licensing

After receiving an application for a licence to transport Category I, II or III nuclear material with the transportation security plan, the CNSC will evaluate the adequacy of the information submitted and will accordingly:

- if the application meets regulatory requirements, issue the requested licence at its earliest convenience, or as requested by the applicant; or
- if the application is incomplete, or inadequate in some other respect, advise the applicant of the deficiency.

Where circumstances warrant, an applicant for any CNSC licence may choose to deliberately submit an incomplete application, requesting CNSC review of the same. In such cases, the applicant should provide justification for the request and a schedule for completing the application.

To allow maximum time for regulatory review and processing of applications for such a licence, the CNSC encourages the applicants to submit their proposed transportation security plans as soon as possible, and in advance of the rest of the application where necessary in the interests of timeliness.

The transportation security plan is fundamental to the safety and security of the proposed transport, and, accordingly, will be subjected to rigorous regulatory review. Where this review identifies deficiencies, the deficiencies will need to be resolved before the licence to transport Category I, II or III nuclear material may be issued.

Appendix A to this guide provides advice on preparing, submitting and revising transportation security plans.

5.0 TRANSPORT SECURITY MEASURES

This section provides supplementary guidance that applicants for a licence to transport Category I, II or III nuclear material may find useful when developing a transportation security plan under section 5 of the *Nuclear Security Regulations*. The following measures derive from regulatory requirements, national practices and international arrangements, and apply to all or specific categories, as indicated by the respective headings.

5.1 Measures for all categories of nuclear material

5.1.1 International protocols

Canada is a party to the *Convention on the Physical Protection of Nuclear Material*, developed under the auspices of the International Atomic Energy Agency (IAEA). The convention calls upon parties to cooperate in providing protection of nuclear material during its transport across national borders, and to apply the following protocols.

- Before nuclear material is transported internationally, the shipper should ensure that the transport arrangements are in accordance with the physical protection regulations of the receiving country, and of any other countries through which the shipment is to pass — *The Physical Protection of Nuclear Material and Nuclear Facilities*, INFCIRC/225/Rev. 4 (Corrected) of the IAEA, subsection 8.1.5.
- The nuclear regulatory agencies in the countries involved should be aware of the planned transport of nuclear material across a national border, and should be in agreement as to who will be responsible for the shipment at the various stages
- The shipper and the receiver of nuclear material that is to be transported across a national border should have an agreement that clearly states the point at which the responsibility for physical protection of the shipment transfers from the shipper to the receiver.

- As long as material is within the borders of a country, it is subject to the regulatory regime of that country. For example, in the case of shipments between Canada and the United States, responsibility for physical protection begins and ends at the border between the two countries. This means that a shipment entering Canada from the United States becomes the responsibility of the CNSC licensee as soon as it enters Canada. Accordingly, if the nuclear material is to be imported into Canada, or exported from Canada, the receiver, or the shipper, respectively, must obtain from the CNSC, before the shipment crosses the border, the appropriate transport licence, along with an import licence in the former case, and an export licence in the latter.
- Where a shipment of nuclear material might pass through the territory, including the territorial waters and air space, of more than two countries, the sending and receiving countries should include the other countries in their arrangements in order to enlist their cooperation in assuring adequate physical protection of the shipment.

5.1.2 Other principles

- Since nuclear material can be especially vulnerable to theft or acts of sabotage when being transported, licensees should provide to nuclear material that is in transport a level of physical protection comparable to that provided for similar material during use or storage.
- The total time that the nuclear material remains in transport should be minimized.
- The number and duration of any transfers of the nuclear material from one conveyance vehicle to another, or to and from temporary or longer-term storage, should be minimized.
- Fixed transport schedules for the movement of the nuclear material should be avoided.
- The routes used to transport the nuclear material should be varied, taking into account applicable regulations and ordinances regarding transport routes for radioactive and hazardous materials.
- Data about the movement of the nuclear material should be restricted to authorized persons.
- Preliminary arrangements for the shipment of the nuclear material should be made with the receiver before the material is shipped, and details such as mode of transport, the handover point and the arrival time should be subsequently confirmed.
- The trustworthiness of everyone who is to be involved in the transport of the nuclear material should be verified in advance of shipment, in accordance with the licensee's established procedures.

- Where warranted, a transport security control centre should be established to coordinate the transport of the nuclear material and to make sure that secure and reliable communications are in place at all times during the transport of the nuclear material.

5.2 Category-specific measures

5.2.1 Measures for the transport of Category I nuclear material

5.2.1.1 Communications

The shipper of Category I nuclear material should, in advance of the planned shipment, inform the receiver of the characteristics of the nuclear material, its planned modes of transport, and its anticipated date, time and location of arrival.

Before the transport begins, the shipper should confirm that the receiver is willing and prepared to receive the shipment. Upon the arrival of the shipment, the receiver should immediately notify the shipper of the arrival. If the shipment does not arrive at its intended destination after an interval agreed to in advance by the shipper and the receiver, the receiver should immediately notify the shipper of the incident.

Reliable and secure communications are essential during the transport of Category I nuclear material. Communications by two-way radio concerning the transport of such nuclear material should consist of encrypted messages only. During the transport, the escort should remain in frequent contact with the shipper, the receiver, the local authorities and the response forces along the transport route. When planning for the shipment, the shipper should establish a plan of action in the event that communications are lost during shipment. The establishment of a transport security control centre should be considered.

If a shipment of nuclear material is lost or stolen, the licensee must, pursuant to paragraph 27(b) of the *NSCA* and paragraph 29(1)(a) of the *General Nuclear Safety and Control Regulations*, immediately make a preliminary report to the CNSC of the location and circumstances of the situation and of any action that the licensee has taken or proposes to take with respect to it.

5.2.1.2 Locks and seals

Packages that contain Category I nuclear material should be transported in closed, locked and sealed vehicles or freight containers. Where necessary, packages that contain Category I nuclear material and weigh more than 2000 kg may, if locked, sealed and secured to the vehicle or freight container, be transported on an open vehicle. The integrity of the package locks and seals should be checked before departure, during the journey, and on arrival at the final destination, in order to detect, in a timely manner, any tampering.

5.2.1.3 Escorts

Shipments of Category I nuclear material should be accompanied by armed guards, or continuously escorted by a vehicle containing armed guards. The guards should maintain routine communications with the shipper, the receiver, the local authorities and the response forces along the transport route, until such time responsibility for the shipment has been transferred to the receiver.

5.2.1.4 Security measures

All shipments of Category I nuclear material should be made, regardless of the mode of transport, in vehicles that are dedicated solely to the transport of such material.

Before shipping the nuclear material, the shipper should ensure that the selected carrier is aware of, and can comply with, the required physical security measures. When dealing with third-party carriers, the shipper should emphasize to the carrier the need for confidentiality in matters concerning shipments of Category I nuclear material, and the need for the carrier to assure that everyone under his control who is to be involved in the planned transport of nuclear material is trustworthy.

Before a vehicle is loaded with a shipment of Category I nuclear material, qualified personnel should conduct a rigorous search of the vehicle to ensure that there has been no attempt to sabotage it. Immediately following completion of the security search of the vehicle, it should be closed, locked, sealed and placed in a secure area pending its loading for transport.

5.2.1.5 Transport by road

Any vehicle that is to be used to transport Category I nuclear material by road should be manned and loaded so as to deter sabotage or theft of the cargo during transport.

The driver of the transport vehicle should be accompanied by an armed guard, and the transport vehicle itself should be escorted by a separate vehicle carrying a driver and one or more armed guards. The escort vehicle should maintain constant surveillance of the shipment.

The cargo should be firmly secured to the transport vehicle.

5.2.1.6 Transport by rail

During transport by rail, Category I nuclear material should be carried in a freight car of a railway train dedicated to the transport of freight. The car should be locked and sealed. Two or more guards should maintain constant surveillance of the car containing the nuclear material by travelling in an adjoining car. At regular intervals, the guards should check the integrity of the locks and seals of the freight car.

5.2.1.7 Transport by ship

During transport by ship, Category I nuclear material should be carried in a locked and sealed freight container that is securely loaded onto a vessel dedicated to the transport of cargo. Two or more guards should accompany the shipment and maintain constant surveillance of it. At regular intervals, the guards should check the integrity of the locks and seals of the freight container.

5.2.1.8 Transport by air

During transport by air, Category I nuclear material should be carried in a locked and sealed freight container that is placed on a chartered aircraft dedicated to the transport of cargo. Two or more guards should accompany the shipment and maintain constant surveillance of it. At regular intervals, the guards should check the integrity of the locks and seals of the freight container.

5.2.2 Measures for the transport of Category II nuclear material**5.2.2.1 Communications**

The shipper of Category II nuclear material should, in advance of the planned shipment, inform the receiver of the characteristics of the

nuclear material, its planned modes of transport, and its anticipated date, time and location of arrival.

Before the transport begins, the shipper should confirm that the receiver is willing and prepared to receive the shipment. Upon the arrival of the shipment, the receiver should immediately notify the shipper of the arrival. If the shipment does not arrive at its intended destination after an interval agreed to in advance by the shipper and the receiver, the receiver should immediately notify the shipper of the incident.

During the transport of Category II nuclear material, the escort should remain in frequent contact with the shipper, the receiver, the local authorities and the response forces along the transport route. When planning for the shipment, the shipper should establish a plan of action in the event that communications are lost during shipment. The establishment of a transport security control centre should be considered.

If a shipment of nuclear material is lost or stolen, the licensee must, pursuant to paragraph 27(b) of the *NSCA* and paragraph 29(1)(a) of the *General Nuclear Safety and Control Regulations*, immediately make a preliminary report to the CNSC of the location and circumstances of the situation and of any action that the licensee has taken or proposes to take with respect to it.

5.2.2.2 Locks and seals

Packages that contain Category II nuclear material should be transported in closed, locked and sealed vehicles or freight containers. Where necessary, packages that contain Category II nuclear material and weigh more than 2000 kg may, if locked, sealed and secured to the vehicle or freight container, be transported on an open vehicle. The integrity of the package locks and seals should be checked before departure, during the journey, and on arrival at the final destination, in order to detect, in a timely manner, any tampering.

5.2.2.3 Escorts

Shipments of Category II nuclear material should be accompanied by one or more escorts, such as nuclear security guards authorized pursuant to section 31 of the *Nuclear Security Regulations*. These

escorts should maintain constant surveillance of the shipment by travelling in the cargo vehicle or in an accompanying vehicle.

5.2.2.4 Security measures

Before shipping Category II nuclear material, the shipper should ensure that the selected carrier is aware of, and can comply with, the required physical security measures. When dealing with third-party carriers, the shipper should emphasize to the carrier the need for confidentiality in matters concerning the shipments of Category II nuclear material, and the need for the carrier to assure that everyone under his control who is to be involved in the planned transport of nuclear material is trustworthy.

The number of cargo transfers during the shipment of Category II nuclear material, and the length of time the shipment is in active transport, should be minimized.

5.2.2.5 Transport by road

Before a vehicle is loaded with a shipment of Category II nuclear material, qualified personnel should conduct a rigorous security search of the vehicle to ensure that there has been no attempt to sabotage it. Immediately following completion of the security search of the vehicle, it should be placed in a secure area pending its loading for transport. The transport vehicle, once loaded with Category II material for transport and in transit, should be locked and sealed when not on the move, and should never be left unattended.

5.2.2.6 Transport by rail

During transport by rail, Category II nuclear material should be carried in a car of a train dedicated to the transport of freight, or in a dedicated freight car attached to a passenger train. The car should be locked and sealed.

5.2.2.7 Transport by ship

During transport by ship, Category II nuclear material should be carried in a locked and sealed freight container.

5.2.2.8 Transport by air

During transport by air, Category II nuclear material should be carried in a locked and sealed freight container that is placed on an aircraft dedicated to the transport of cargo.

5.2.3 Measures for the transport of Category III nuclear material

5.2.3.1 Communications

The shipper of Category III nuclear material should, in advance of the planned shipment, inform the receiver of the characteristics of the nuclear material, its planned modes of transport, and its anticipated date, time and location of arrival.

Before the transport begins, the shipper should confirm that the receiver is willing and prepared to receive the shipment. Upon the arrival of the shipment, the receiver should immediately notify the shipper of the arrival. If the shipment does not arrive at its intended destination after an interval agreed to in advance by the shipper and the receiver, the receiver should immediately notify the shipper of the incident.

If a shipment of nuclear material is lost or stolen, the licensee must, pursuant to paragraph 27(b) of the *NSCA* and paragraph 29(1)(a) of the *General Nuclear Safety and Control Regulations*, immediately make a preliminary report to the CNSC of the location and circumstances of the situation and of any action that the licensee has taken or proposes to take with respect to it.

5.2.3.2 Locks and seals

Packages that contain Category III nuclear material should be transported in closed, locked and sealed vehicles, or in locked and sealed freight containers, when feasible.

5.2.3.3 Security measures

Before shipping Category III nuclear material, the shipper should ensure that the selected carrier is aware of, and can comply with, the required physical security measures. When dealing with third-party carriers, the shipper should emphasize to the carrier the need for confidentiality in matters concerning the shipments of Category III nuclear material, and the need for the carrier to assure that everyone under his control who is to be involved in the planned transport of nuclear material is trustworthy.

The number of cargo transfers during the shipment of Category III nuclear material, and the length of time the shipment is in active transport, should be minimized.

5.2.3.4 Transport by road

Before a vehicle is loaded with a shipment of Category III nuclear material, qualified personnel should conduct a rigorous security search of the vehicle to ensure that there has been no attempt to sabotage it. Immediately following completion of the security search of the vehicle, it should be placed in a secure area pending its loading for transport. The transport vehicle, once loaded with Category III material for transport and in transit, should be locked and sealed when not on the move, and should never be left unattended.

5.2.3.5 Transport by rail

During transport by rail, Category III nuclear material should be carried in a car of a train dedicated to the transport of freight, or in a dedicated freight car attached to a passenger train. The car should be locked and sealed.

5.2.3.6 Transport by ship

During transport by ship, Category III nuclear material should be carried in a locked and sealed freight container.

5.2.3.7 Transport by air

During transport by air, Category III nuclear material should be carried in a locked and sealed freight container that is placed on an aircraft dedicated to the transport of cargo.

GLOSSARY

escort

Any person who accompanies a shipment of nuclear material to provide protection against compromise or attack.

IAEA

International Atomic Energy Agency.

prescribed information

Prescribed information for the purposes of the *Nuclear Safety and Control Act*, as described in subsection 21(1) of the *General Nuclear Safety and Control Regulations*.

response force

A local, provincial or federal police force detachment, a Canadian Armed Forces unit or any other response force that is authorized under any act or regulation to carry firearms, and trained and qualified to use them.

sabotage

Any deliberate act directed against a plant, facility, nuclear material transport vehicle or nuclear material that could directly or indirectly endanger the health and safety of the public by exposing them to radiation.

REFERENCES

Canada, *General Nuclear Safety and Control Regulations*, SOR/2000-202.

-----, *Nuclear Safety and Control Act*, R. S. C. 1997, c. 9.

-----, *Nuclear Security Regulations*, SOR/2000-209.

-----, *Packaging and Transport of Nuclear Substances Regulations*, SOR/2000-208.

-----, *Transportation of Dangerous Goods Regulations*, SOR/85-77.

International Atomic Energy Agency (IAEA). *The Convention on the Physical Protection of Nuclear Material*, INFCIRC/274/Rev. 1. Vienna: IAEA, May 1980.

-----, *Guidance and Considerations for Implementation of INFCIRC/225/Rev. 4 (Corrected), The Physical Protection of Nuclear Material and Nuclear Facilities*, TECDOC-967/Rev. 1. Vienna: IAEA, July 2000.

-----, *The Physical Protection of Nuclear Material and Nuclear Facilities*, INFCIRC/225/Rev. 4 (Corrected). Vienna: IAEA, June 1999.

APPENDIX A

Preparing, submitting and revising a transportation security plan

The following recommendations are provided to help applicants and licensees prepare and submit, or revise, a transportation security plan for Category I, II or III nuclear material.

1. General

- The information contained in the plan should be clear and concise.
- The definitions and abbreviations used should be consistent throughout the plan.
- The specialized terms used in the plan should conform to those defined or used for comparable purposes in relevant regulations.
- Any drawings and sketches included in the plan should be large enough so as to be clearly legible.
- To minimize duplication, information that is provided in one section may be cross-referenced for the purposes of other sections of the plan.

2. Physical specifications

- The plan should be printed on standard 8½ x 11 inch paper.
- For convenience or to ensure clarity, drawings and sketches that are part of the plan may be submitted on paper larger than 8½ x 11 inch.
- The pages of the plan should be punched for standard 3-ring binders.
- The text of the plan should be single-spaced.

3. Confidentiality and security

Pursuant to sections 21 and 23 of the *General Nuclear Safety and Control Regulations*, the transportation security plan is “prescribed information” and must be protected to prevent any unauthorized access. This requires that the plan, and all correspondence between the Canadian Nuclear Safety Commission (CNSC) and licence applicants or licensees that concern the plan, be treated as confidential or protected information, as follows.

- The top right hand corner of each page of the plan should bear the security classification level of the document, i.e. “**CONFIDENTIAL**” or “**PROTECTED — SECURITY**”, in bold, upper case letters.
- The plan and the related correspondence may be forwarded to the CNSC by mail, courier or “secure facsimile”.

For delivery to the CNSC by mail or courier, the plan and the related correspondence should be “double-enveloped”, with the plan and correspondence contained within the inner envelope or package. The inner envelope or package should be addressed to the “CNSC Nuclear Security Advisor”, sealed and clearly marked “CONFIDENTIAL” or “PROTECTED — SECURITY”, labelled “TO BE OPENED BY THE ADDRESSEE ONLY”, and inserted into an outer envelope or package. The outer envelope or package should be sealed and addressed to:

Canadian Nuclear Safety Commission
280 Slater Street
P. O. Box 1046, Station B
Ottawa, Ontario K1P 5S9

If the plan and the related correspondence are sent to the CNSC by “secure facsimile”, the transmission should meet the Level I (“Confidential”) requirements of the Communications Security Establishment.

Upon receiving the plan or the related correspondence, the CNSC will protect it from unauthorized disclosure, in accordance with the *General Nuclear Safety and Control Regulations* and the *Access to Information Act*.

4. Style, structure and layout

- The plan should contain a title page, a table of contents and a glossary of any specialized term used in the plan.
- The pages of the plan should be numbered sequentially, using a numbering convention that indicates the total number of pages contained in the plan (e.g., “Page 1 of 5”).
- The top left hand corner of each page of the plan should display a unique identifier, such as
TSP YYYY-MM-DD VN, where:
TSP = Transportation security plan
YYYY-MM-DD = Date of preparation in numeric form (Year-Month-Day)
VN = Version number (“V1”, “V2”,...)
- Information items should be numbered and identified, as appropriate, according to the sequence and headings given in section 4.1 of this guide, i.e.:
 1. Administrative information
 2. Description of the nuclear material
 3. Threat assessment
 4. Description of the conveyance
 5. Proposed security measures

6. Communication arrangements
7. Arrangements with response forces
8. Planned and alternate routes

5. Revising the plan

CNSC licensees must comply with the applicable regulations and licence conditions, including any condition of their licence that requires them to adhere to a referenced transportation security plan. To modify the referenced plan, the licensee must first obtain CNSC approval of the proposed changes.

When requesting CNSC approval to revise an existing transportation security plan, the licensee should describe, and explain the reasons for, the proposed changes. The request for approval should include a single, complete, copy of the new version of the transportation security plan. To assist CNSC review, the proposed revisions or revised sections should be underlined or highlighted. The proposed transportation security plan should follow the above recommendations, and be clearly identified, using the convention described in section 4 above (i.e., TSP YYYY-MM-DD VN).

APPENDIX B

Category I, II and III nuclear material

Category I, II and III nuclear material are defined as follows in section 1 of the *Nuclear Security Regulations*, and in its Schedule.

- **Category I nuclear material** means “a nuclear substance listed in column 1 of the schedule [see below] that is in the corresponding form set out in column 2 and the corresponding quantity set out in column 3 of the schedule.”
- **Category II nuclear material** means “a nuclear substance listed in column 1 of the schedule [see below] that is in the corresponding form set out in column 2 and the corresponding quantity set out in column 4 of the schedule.”
- **Category III nuclear material** means “a nuclear substance listed in column 1 of the schedule [see below] that is in the corresponding form set out in column 2 and the corresponding quantity set out in column 5 of the schedule.”

	<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>	<i>Column 5</i>
Item	Nuclear substance	Form	Quantity (Category I) ^a	Quantity (Category II) ^a	Quantity (Category III) ^a
1	Plutonium ^b	Unirradiated ^c	2 kg or more	Less than 2 kg, but more than 500 g	500 g or less, but more than 15 g
2	Uranium-235	Unirradiated ^c — uranium enriched to 20% ²³⁵ U or more	5 kg or more	Less than 5 kg, but more than 1 kg	1 kg or less, but more than 15 g
3	Uranium-235	Unirradiated ^c — uranium enriched to 10% ²³⁵ U or more, but less than 20% ²³⁵ U	N/A	10 kg or more	Less than 10 kg, but more than 1 kg
4	Uranium-235	Unirradiated ^c — uranium enriched above natural, but less than 10% ²³⁵ U	N/A	N/A	10 kg or more
5	Uranium-233	Unirradiated ^c	2 kg or more	Less than 2 kg, but more than 500 g	500 g or less, but more than 15 g

a. The quantities listed refer to the aggregate of each kind of nuclear substance located at a facility, excluding the following (which are considered separate quantities):

- (1) any quantity of the nuclear substance that is not within 1000 m of another quantity of the nuclear substance; and
 - (2) any quantity of the nuclear substance that is located in a locked building or a structure offering similar resistance to unauthorized entry.
- b. All plutonium except that with isotopic concentration exceeding 80% in plutonium-238.
- c. Material not irradiated in a reactor or material irradiated in a reactor but with a radiation level equal to or less than 1 Gy/h at 1m unshielded.

6	Fuel consisting of depleted or natural uranium, thorium or low-enriched fuel (less than 10% fissile content) ^d	Irradiated	N/A	More than 500 g of plutonium	500 g or less, but more than 15 g of plutonium
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Source: *Nuclear Security Regulations*, Schedule.

d. Other fuel that by virtue of its original fissile content is classified as Category I or II before irradiation may be reduced one category level while the radiation level from the fuel exceeds 1 Gy/h at 1 m unshielded.

